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Form Approved
OMB No. 0704-0188

to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, wing the collection of information. Send comments regarding this burden estimate or any other aspect of this n, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson e of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	00/00/00	

4. TITLE AND SUBTITLE
VERIFICATION STUDIES ON SOLIDIFICATION OF BASIN F WASTES

5. FUNDING NUMBERS

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

ARMY ENGINEER WATERWAYS EXPERIMENT STATION. ENVIRONMENTAL LABORATORY
VICKSBURG, MS

8. PERFORMING ORGANIZATION REPORT NUMBER

83228R02

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MD

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

DTIC
ELECTE
NOV 10 1994
G
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11. SUPPLEMENTARY NOTES

94-34876

12a. DISTRIBUTION/AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

OBJECTIVES OF THIS STUDY:
1) VERIFY SOLIDIFICATION CONCEPTS DEVELOPED IN PREVIOUS STUDIES,
2) IDENTIFY TEST PROCEDURES NEEDED TO MONITOR SOLIDIFICATION PROCESSING,
3) DEVELOP PERFORMANCE CRITERIA FOR SOLIDIFIED BASIN F WASTES.

DTIC QUALITY INSPECTED 5

14. SUBJECT TERMS
AMMONIA RELEASE

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED			

83228R02
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VERIFICATION STUDIES ON SOLIDIFICATION OF BASIN F WASTES

BY

ENVIRONMENTAL LABORATORY
U.S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION
VICKSBURG, MS 39180

FOR

U. S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MD 21010

Rocky Mountain Arsenal
Information Center
Commerce City, Colorado

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OBJECTIVES

- VERIFY SOLIDIFICATION CONCEPTS DEVELOPED IN PREVIOUS STUDIES
- IDENTIFY TEST PROCEDURES NEEDED TO MONITOR SOLIDIFICATION PROCESSING
- DEVELOP PERFORMANCE CRITERIA FOR SOLIDIFIED BASIN F WASTES

RESULTS FROM PREVIOUS STUDY

- SOLIDIFICATION IS A FEASIBLE TECHNIQUE FOR CONVERTING BASIN F LIQUID TO A SOLID FORM.

- LARGE QUANTITIES OF AMMONIA GAS ARE RELEASED WHEN VARIOUS SOLIDIFICATION REAGENTS ARE ADDED TO BASIN F LIQUID.

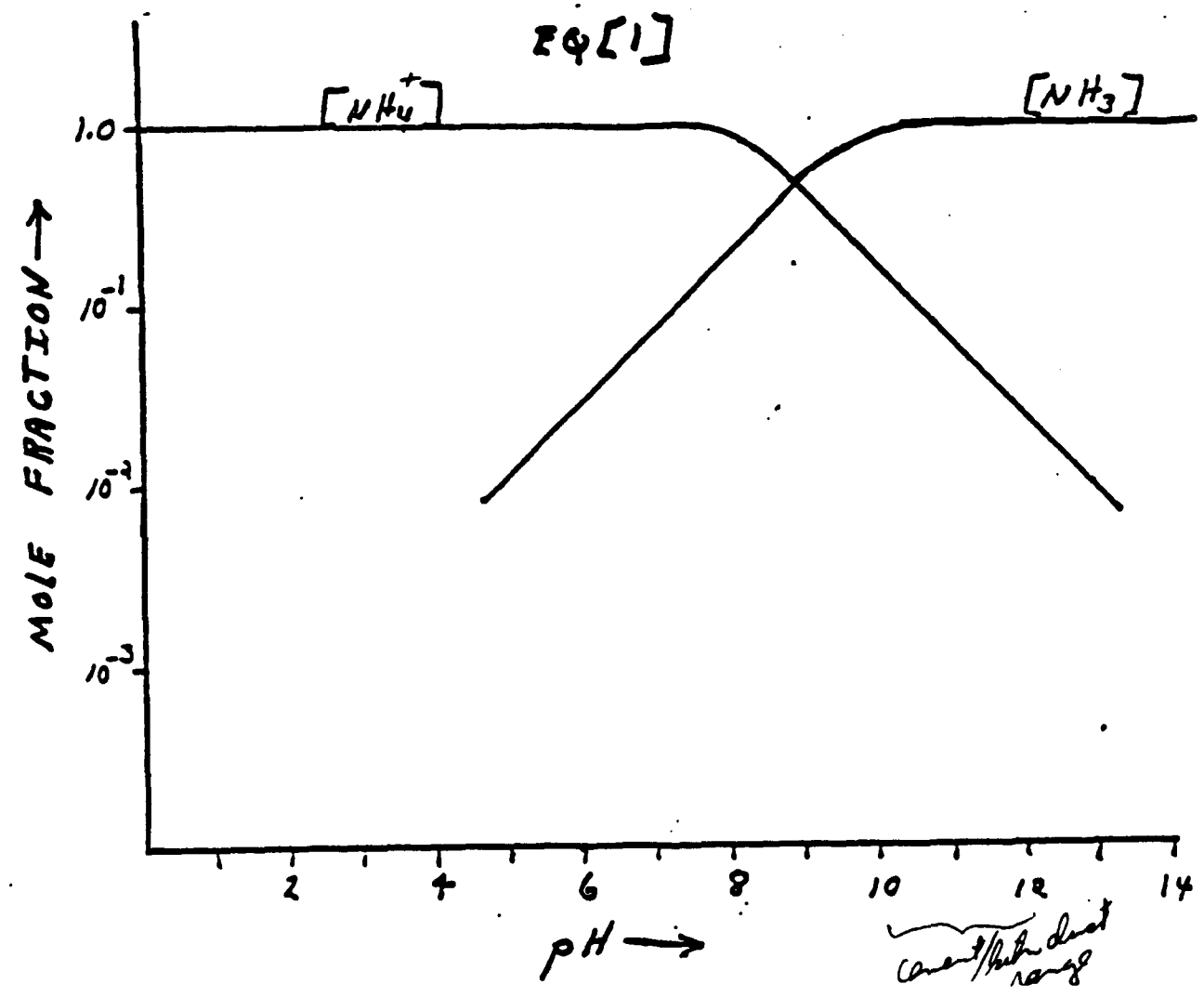
CHEMISTRY OF AMMONIA RELEASE

I. IONIZATION EQ

$$NH_4^+ + OH^- \rightleftharpoons NH_3 + H_2O$$

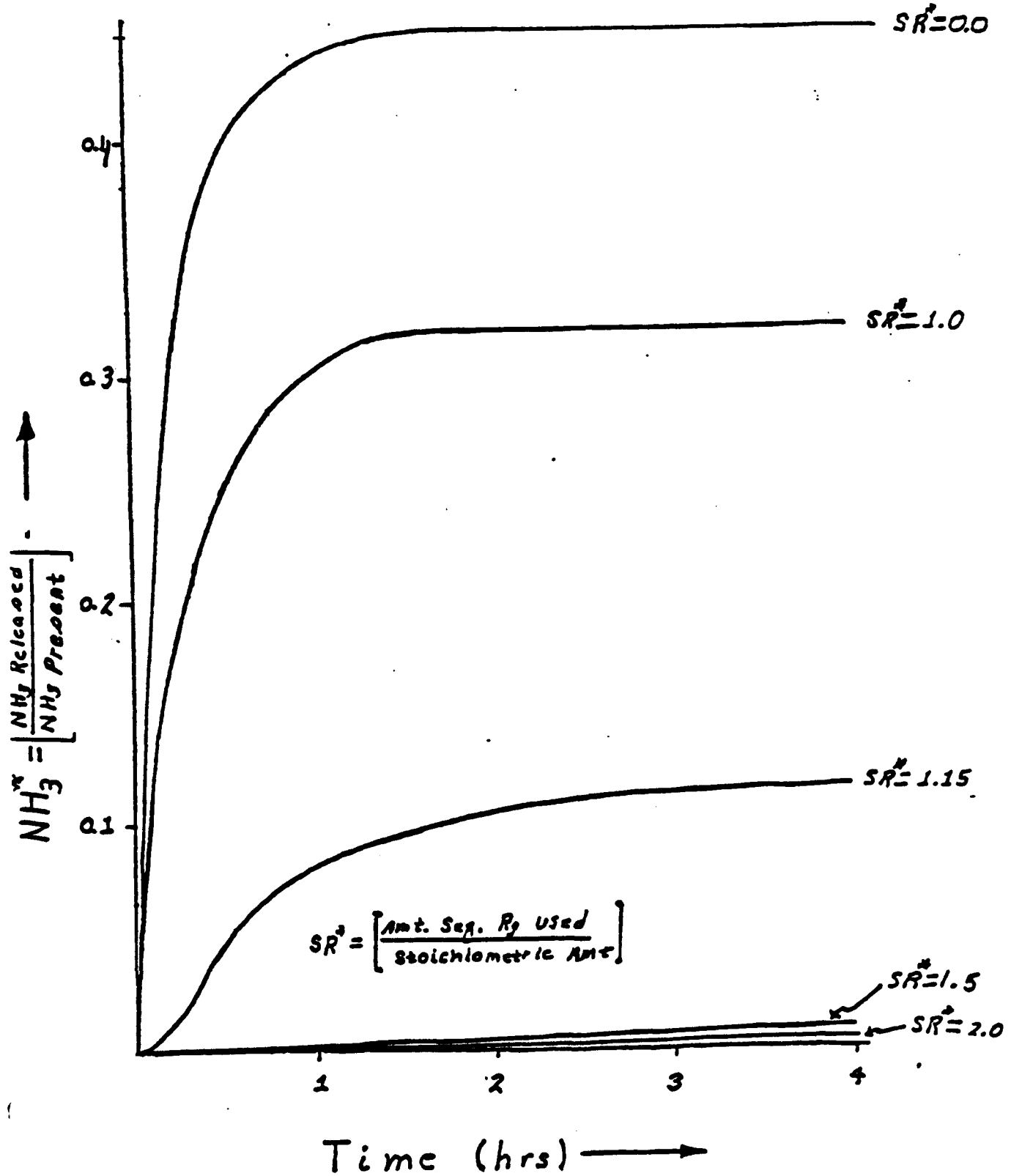
II. CHANGE OF PHASE EQ

$$NH_{3(aq)} \rightleftharpoons NH_{3(g)}\uparrow$$

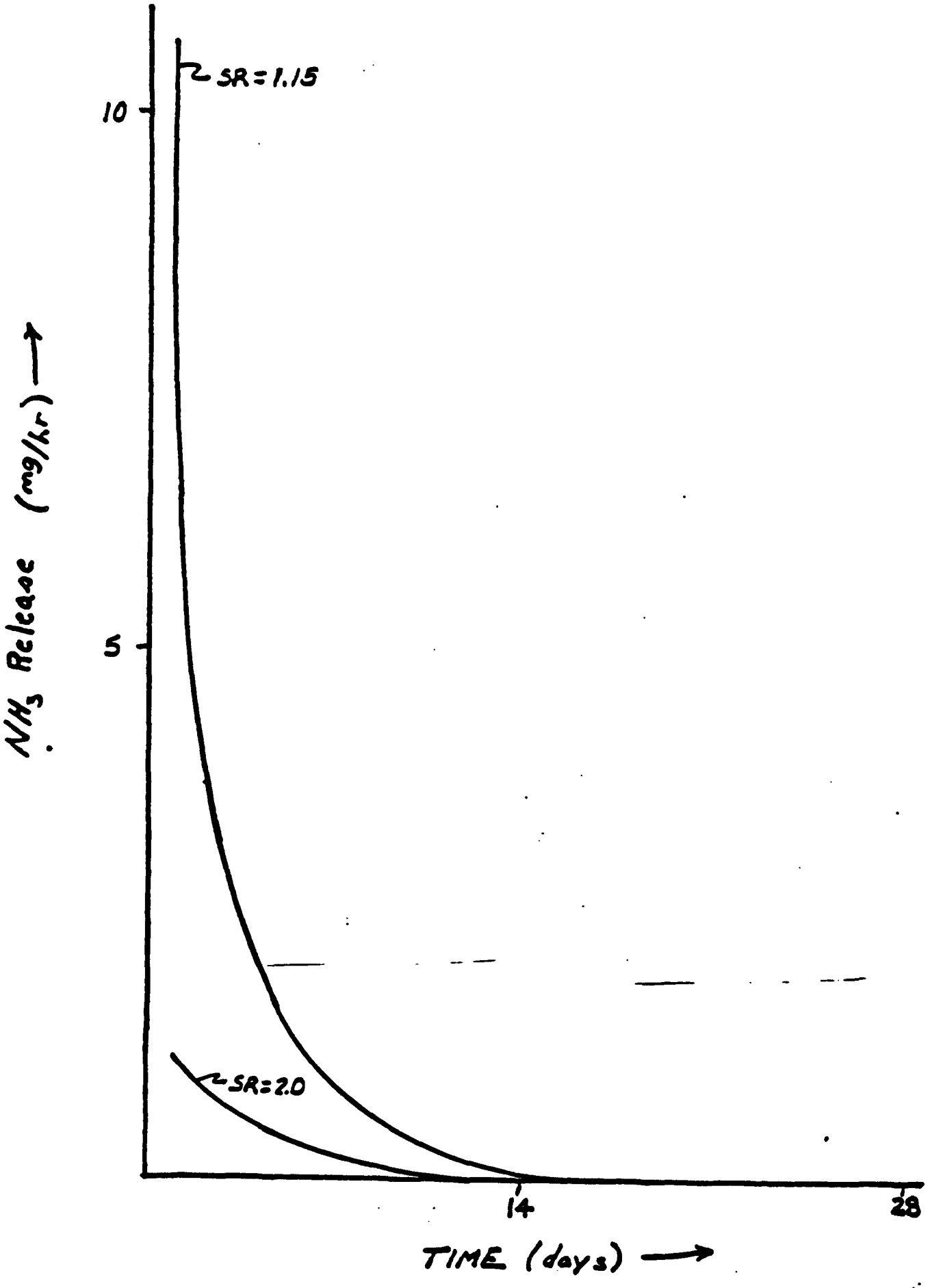


SEQUESTERING OF AMMONIA RELEASE BY $MgNH_4PO_4 \cdot 6H_2O$ PRECIPITATION

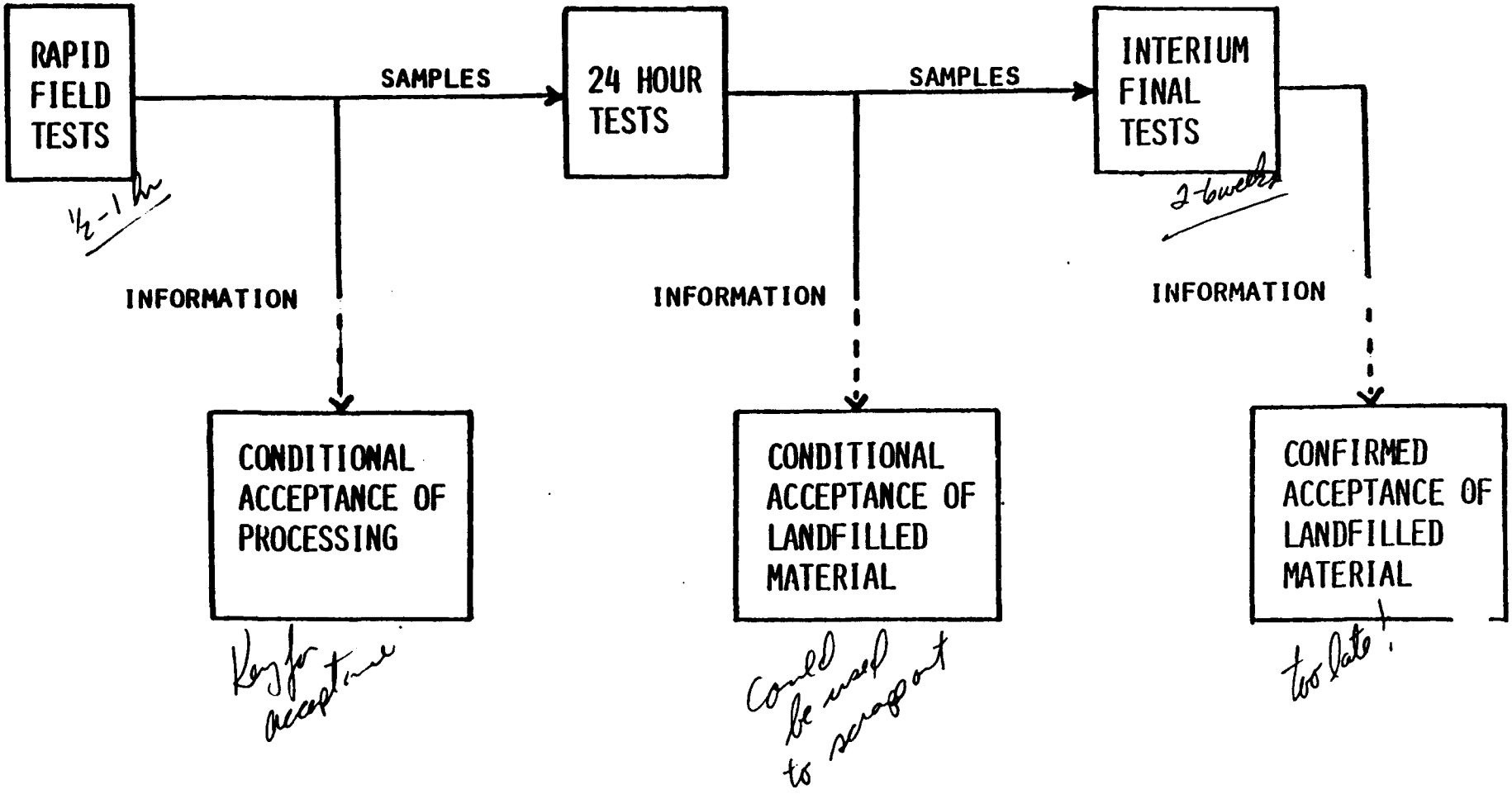
(MgSO4 Phosphoric acid)



SEQUESTERING OF AMM IA RELEASE RATE BY $MgNH_4P_4 \cdot 6H_2O$ PRECIPITATION



ACCEPTANCE TESTING OF SOLIDIFIED WASTE



PERFORMANCE TESTING OF FRESH SOLIDIFIED WASTE

PROCESS	CURE TIME (HR)	NP (MM)	PP (PSI)	CP (PSI)	UCS (PSI)
WEAK	¼	>50	<60	8	-
X=0.5	1	>50	<60	20	3.8
	24	<0.1	502	246	7.0
MEDIUM	¼	>50	<60	23	-
X=0.6	1	37	107	67	5.5
	24	<0.1	653	310	9.4
STRONG	¼	32	-	213	-
X=0.7	1	8.5	450	256	24
	24	<0.1	>700	503	21

NP: NEEDLE PENETROMETER

PP: POCKET PENETROMETER

CP: CONE PENETROMETER

UCS: UNCONFINED COMPRESSIVE STRENGTH

PROCESS:

SOIL	0.8
FLYASH	0.8
LIME	X (.5-.7)
SEQ REG	1.1
BF LIQ	1.0

4.2 - 4.4

SCHEDULE AND STATUS